Allergy Abstracts

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Asthma and Hay Fever

Progressive Bronchospastic Disease: Primary Obstructive Emphysema. Bradford, J.: Amer. Pract. **3**: 349, 1952.

Progressive bronchospastic disease is a syndrome that has been mistaken for other chronic pulmonary diseases, particularly the intrinsic type of bronchial asthma. It occurs principally in males over 50 years of age and is characterized in its early phase by severe cough and dyspnea confined to a period of 30 to 60 minutes after arising in the morning. No abnormal physical signs are present and the vital capacity is normal or even increased. Maximal breathing capacity and residual air are, however, usually reduced. As the disease progresses, impairment of ventilation with resulting dyspnea becomes pronounced. Orthopnea is not present and there is usually still no reduction in the vital capacity. Arterial oxygen and carbon dioxide content are normal at rest and also after exercise. Râles are not present and physical signs during this stage are similar to those encountered when the lungs are overdistended from any cause. With further progression of the disease, evidence of impaired gas exchange and hypoxia appear. Cyanosis occurs after exercise and later even while the patient is at rest. The vital capacity is now markedly diminished and the arterial oxygen saturation is often reduced to 90 per cent or below with elevation of the carbon dioxide content. Cardiac decompensation usually takes place late in the disease and death occurs when failure becomes irreversible. Death, however, may result from pulmonary insufficiency without decompensation. Treatment is largely symptomatic and includes the use of bronchial dilators, iodides, and oxygen. Early recognition of the disease and the institution of proper therapy can often prevent or help retard the progression of the condition. F.

Candida Asthma. Keeney, E. L.: Ann. Int. Med. **34**: 223, 1951.

A 37-year-old man with a history of asthma for the past 16 months was studied. The patient had had a chronic cough with expectoration of clear mucus for 6 months prior to the onset of asthma. For 3 months before and 3 months after the onset of the cough he had been treated for a sore mouth by his dentist. The past, personal, and family histories were negative for atopic illnesses. On physical examination, small white plaques were noted over the portion of his gums covered by the upper denture. Musical râles were heard throughout his lung fields. X-ray of his chest revealed peribronchial infiltration. Blood and urine examinations were normal except for a 16 per cent blood eosinophilia. Direct microscopic examination of a plaque taken from the mouth showed it to be composed entirely of hyphae and yeast cells. Sputum examination revealed many hyphae and yeast cells which were gram positive. Cultures of the sputum and scrapings from the mouth revealed *Candida albicans* colonies. *Staphylococcus aureus* and alpha hemolytic streptococcus were also found in the sputum. Intracutaneous tests with numerous inhalant and food antigens yielded negative results. Delayed reactions of the tuberculin type were obtained with *Staphylococcus aureus* and *Staph. albus* vaccines. Skin tests performed with one protein and two carbohydrate fractions isolated from a concentrated *Candida albicans* broth filtrate resulted in large immediate wheal reactions and marked delayed reactions after 48 hours. The immediate positive reactions to the fractions of *Candida albicans* were passively transferred to 2 recipients. When 25 normal individuals were tested with the fractions, all showed negative immediate reactions and 3 showed slight delayed reactions. Precipitin tests, using each of the three fractions as antigens, were positive in a 1:16 dilution of the patient's serum. The patient was treated with sodium caprylate aerosol and improved in 2 weeks. After 4 weeks, he was free of asthma and the mouth lesions had disappeared. Therapy was discontinued after 8 weeks and the patient has remained well for over a year. B. S.

Dermatology

Intravenous Use of Procaine Hydrochloride in Control of Pruritus. Beinhauer, L. G., Thomas, G. J., and Perrin, S. R.: Arch. Dermat. & Syph. **65**: 39, 1952.

Procaine hydrochloride was administered intravenously to 181 patients suffering from various dermatoses including neurodermatitis, acute infectious eczematoid dermatitis, urticaria, angioneurotic edema, exfoliative dermatitis, contact dermatitis, seborrheic dermatitis, pruritus ani and vulvae. Complete relief was obtained by 32 per cent of patients, temporary relief was afforded in 67 per cent, and in 30 per cent no relief was obtained. Preliminary intracutaneous tests with procaine were performed on each patient. The 3 patients in the series who manifested positive skin reactions to procaine hydrochloride were not given this treatment. When properly controlled, the intravenous use of procaine hydrochloride may be considered a safe procedure. The authors recommend its use when other forms of therapy fail. C.

The Topical Anesthetic Activity of an Isoquinoline Compound. Fellows, E. J., and Macko, E.: J. Pharmacol. & Exper. Therap. **103**: 306, 1951.

The local anesthetic potency and acute toxicity of 1-(beta-dimethylaminoethoxy)-3-butyl isoquinoline monohydrochloride (Quotane) were compared with those of cocaine, procaine, and dibucaine (Nupercaine). Varied concen-

trations of the drugs were used and the duration of anesthesia was measured. It required about 1,000 times more cocaine than Quotane to produce anesthesia of the rabbit conjunctiva lasting more than 20 minutes. Dibucaine similarly tested appeared to be about $\frac{1}{10}$ as potent as Quotane and procaine was barely effective. Intracutaneous anesthetic activity in guinea pigs indicated Quotane was more than 10 times as potent as procaine and slightly more effective than Nupercaine. The acute intraperitoneal toxicity in rats expressed as the LD_{50} for cocaine was 75 to 100 mg. kg., for dibucaine was 30 mg. kg. and for Quotane was 45 to 50 mg. kg. On intravenous injection in rabbits, the LD_{50} was 5.0 mg. kg. for Quotane as compared with 2.0 to 2.5 for dibucaine. Over a 30-day period when Quotane was administered orally in 50 mg. doses daily to rats and intravenously in 5.0 mg. doses to guinea pigs, no chronic toxic effects were noted grossly or microscopically. K.

Zirconium Treatment in Ivy Poisoning: Preliminary Investigation. Cronk, G. A., and Naumann, D. E.: J. Lab. & Clin. Med. **37**: 909, 1951.

The efficacy of zirconium treatment was investigated in 2 patients with experimentally induced R. toxicodendron dermatitis and in 47 patients who had spontaneously developed Rhus dermatitis. Both individuals with the induced lesions and 85 per cent of the other patients experienced relief of pruritus and regression of the dermatitis. Zirconium salts exert their effect by combining with the hydroxyl groups of urushiol and rendering it inactive. Studies have shown that zirconium hydrate does not produce local or constitutional toxic effects. E. W.

Treatment of Severe Rhus Dermatitis With Corticotropin or Cortisone. Falk, M. S., Allende, M. F., and Bennett, J. H.: J. Invest. Dermat. **18**: 307, 1952.

Nine patients with severe rhus dermatitis requiring hospitalization were treated with either cortisone in doses ranging from 100 to 200 mg. per day or with ACTH in amounts varying from 60 to 100 mg. per day. Pruritus was relieved within 12 to 36 hours. The dosages were reduced rapidly just as soon as improvement occurred. Most of the cases were ready for discharge by the end of the third hospital day and were able to resume work at this time. A group of 10 cases with rhus dermatitis of equal severity treated by routine measures, required approximately 6 and one-half days of hospitalization and experienced 11 days of disability. The authors conclude that either ACTH or cortisone is the treatment of choice in acute Rhus dermatitis when there are no contraindications in the patient to the use of these drugs. R. W.

On an Immediate Urticarial Reaction to Trichophytin. Jadassohn, W., and Suter, M.: Acta Allergologica **4**: 150, 1951.

An immediate urticarial reaction to trichophytin, with a positive passive transfer reaction was observed in a patient, who also showed a very marked tuberculin-type reaction to trichophytin. The immediate reaction was initiated by dried trichophytin prepared from cultures of Achorion quinckeanum using a synthetic medium. This trichophytin preparation acted as a potent anaphylactogen in guinea pigs and also produced delayed tuberculin-type reactions. The "undenatured fungus antigen" produced only a delayed reaction. The authors suggest that the dry trichophytin material probably contained 2 different antigens. H.

Behavior of Allergic Skin Reactions After ACTH Therapy. Haxthausen, H.: Acta Allergologica **4**: 305, 1951.

Six patients with positive urticarial reactions to specific antigens were tested intracutaneously with antigen in decreasing concentrations. These tests resulted in a series of positive reactions of gradually decreasing intensity, making possible the determination of a definite concentration limit for a positive reaction in each subject. These patients were then treated with ACTH (10 mg. three times daily) for 5 days. All showed an eosinopenia and an increased excretion of 17-ketosteroids. Cutaneous testing, repeated as above on a symmetrical skin area, indicated that the border value for a positive reaction had not been affected by ACTH.

Two patients with a contact sensitivity to mercury and 2 other patients sensitive to chromium were also studied. By means of electrophoresis, using a definite concentration of antigen, a definite voltage, and a fixed time factor, an eczematous skin reaction of suitable intensity was produced and read after 24 and 48 hours. These patients were then treated with ACTH for 4 days and the "electrophoresis patch test" was repeated. No change in the reaction was observed.

Nine guinea pigs were sensitized with dinitrochlorbenzene and reacted to approximately the same strength. Three were treated with subcutaneous injections of 2 mg. ACTH daily, 3 with 4 mg. daily, and 3 were untreated. Reactions in the treated animals did not differ from those in the control animals. Three of 6 guinea pigs sensitized by application of 5 per cent DNB were treated with 5 mg. of ACTH daily during the period of sensitization. An epicutaneous test was made after 12 days. The treated and untreated animals reacted similarly.

The author concludes that ACTH in usual therapeutic doses had no distinct influence on the intensity of allergic cutaneous reactions. H.

Elicitation of Delayed Allergic Skin Reactions With Haptens: The Dependence of Elicitation on Hapten Combination With Protein. Eisen, H. N., Orris, L., and Belman, S.: J. Exper. Med. **95**: 473, 1952.

Several guinea pigs and 4 human subjects were sensitized by exposure to 2, 4-dinitrofluorobenzene. Eight other compounds containing the 2, 4-dinitrophenyl group and differing from each other only by the substituent attached to the 1-carbon atom were studied. These haptens were tested as elicitors of contact-type reaction in 0.01 M solution or in more concentrated form where necessary. Four of the hapten compounds failed to elicit responses whereas 4 other compounds were active. It was found that all of those compounds which elicited reactions were chemically reactive with bovine gamma globulin, whereas the nonelicitors failed to react with protein. That the in vitro protein reaction also occurs in vivo was proved by producing widespread reaction lesions on guinea pig skin. Subsequently, the animals were sacrificed and an amino acid was found linked to the hapten (N^5-D-lysine). Again, only the clinically active haptens reacted with skin protein by this test. The hapten containing the $-SO_3$ radical showed poor skin reactivity on human beings until Tween-80 was added. This was interpreted as being due to poor epidermal penetration which was overcome by the detergent. It was noted that at least one of the nonreactors was capable of reacting reversibly with serum albumin. It is apparently important that the affinity of hapten for protein be irreversible (covalent type bonds). To explain the reactivity of nonprotein combiners such as penicillin, the authors suggest the possibility that a protein affinitive degradation compound may be evolved in vivo. K.

ACTH and Cortisone in Diseases of the Skin. Lever, W. F.: New England J. Med. **245**: 359, 1951.

The effects of ACTH and cortisone in more than 70 patients with cutaneous diseases were studied. Good results were obtained with ACTH in cases of severe urticaria with fever due to parenterally administered penicillin and in extensive dermatitis following injections of gold sodium thiosulfate. Two patients with erythema multiforme obtained marked improvement from ACTH therapy. One patient with anaphylactoid purpura (Schönlein-Henoch) responded well except that the nephritis which was already present remained unaffected. One patient with extensive contact dermatitis associated with an eruption due to application of penicillin ointment showed improvement after 2 days of ACTH therapy. In another patient with poison ivy dermatitis, no further spread of the lesions occurred after treatment was started and the edema diminished, but involution of the bullae was not hastened. In an adult patient with atopic eczema, treatment resulted in a remarkable improvement on 2 occasions, but the disease flared up severely within a few days after discontinuance of therapy. In a 1-year-old child with generalized atopic erythroderma, the response to treatment was excellent, but, when therapy was discontinued, the disease recurred, pneumonia and bilateral otitis media developed, and the patient died. I. GLAZER.

Purpura as a Manifestation of Penicillin Sensitivity. Criep, L. H., and Cohen, S. G.: Ann. Int. Med. **34**: 1219, 1951.

Three cases of penicillin sensitivity in which purpura was associated with the delayed serum sickness type of reaction are presented. The purpura was of the nonthrombocytopenic type and there were no disturbances of the clotting mechanism of the blood. One of the patients was an atopic individual. In each case, a positive 48-hour delayed reaction was obtained on intracutaneous testing with penicillin. Each had a positive Rumpel-Leede tourniquet test which returned to normal when the purpura subsided. These findings indicate that the purpura was vascular rather than hematopoietic in origin. These findings also reflect a severe degree of capillary permeability produced as a result of the allergic reaction. B. S.

Genital Dermatitis Caused by Penicillin: It's Response to Nicotinic Acid. Morris, G. E.: New England J. Med. **244**: 758, 1951.

Twenty cases of genital and rectal pellagrous dermatitis following the systemic administration of penicillin were observed. All responded dramatically to 100 mg. of nicotinic acid administered 3 times daily by mouth and cold saline compresses applied locally. It is suggested that penicillin interferes with the utilization of the amino acid tryptophane or prevents its conversion into niacin, or both. The author advises the use of nicotinic acid therapy for any scrotal or rectal itching or redness resulting from the administration of penicillin. I. GLAZER.

The Cutaneous Toxicity and Therapeutic Effectiveness of Penicillin O. Marsh, R. R., and Tollotson, I. G.: New England J. Med. **245**: 17, 1951.

Among 52 patients treated with penicillin O, 4 developed cutaneous reactions. Two of the reactions occurred among 4 patients who had never received penicillin in any form. Two reactions occurred in patients who had experi-

enced untoward reactions from penicillin G. Three patients, who had previously had skin eruptions from penicillin G, could tolerate penicillin O. Among 24 patients who showed no sensitivity to penicillin G, there were no reactions to penicillin O. I. GLAZER.

Effects of ACTH and Cortisone on Certain Diseases and Physiologic Functions of the Skin: I. Effects of ACTH. Sulzberger, M. B., Sauer, G. C., Herrmann, F., Baer, R. L., and Milberg, I. L.: J. Invest. Dermat. **16**: 323, 1951.

The authors observed the effects of ACTH and cortisone on many types of skin diseases. The findings herein presented apply to those cases of an allergic nature which these investigators studied.

Three patients with atopic dermatitis who were receiving 60 to 100 mg. of ACTH per day in divided doses improved considerably, but relapsed soon after the drug was discontinued. Two patients receiving somewhat smaller amounts failed to respond while on the hormone. ACTH tended to increase both the dermal temperature and the sweating of normal skin. The drug did not consistently influence or reduce the patch test responses to "eczematogenic" allergens or the wheal responses to skin tests with "urticariagenic" allergens. Primary dermal irritation, produced either by direct contact with 0.1 per cent anthralin ointment or by the intracutaneous injection of histamine, was not affected by ACTH. R. W.

Eczema of the Hands. Cormia, F. E.: Canad. M. A. J. **66**: 451, 1952.

One hundred fifty cases of eczema of the hands observed in private practice were classified by the author as follows: (1) contact dermatitis due to (a) hypersensitivity, 27, and (b) chemical irritation, 33; (2) dermatophytid, 31; (3) food allergy, 14; (4) atopic eczema, 12; (5) vesicular neurodermatitis, 11; (6) nummular eczema, 6; (7) autoeczematization, 5; (8) ichthyosis, 5; (9) dermatitis medicamentosa, 3. The patients were divided approximately equally between sexes except for the contact group which was made up predominantly of males. Irritation from soap was found to be the most common complicating factor, while psychosomatic influences were the next most frequent aggravating factor. Secondary infection was found to be an important consideration only in cases of nummular eczema. The author stresses the need for using cotton and rubber gloves to avoid contacts and the necessity of employing soap substitutes. He advises the use of bland therapy at all times and the avoidance of both x-ray and tar ointments early in the course of treatment. R. W.

Atopic Dermatitis in Infants and Children. Rowe, A. H., Jr., and Rowe, A. H.: J. Pediat. **39**: 80, 1951.

Among 100 consecutive cases of atopic dermatitis, there was an equal distribution between males and females. In 90 per cent of the cases, the dermatitis began before the age of 2 years. A family history of allergy was obtained in 65 per cent of the cases. Many of the patients had other manifestations of allergy; allergic rhinitis was present in 44 per cent of the cases; bronchial asthma in 26 per cent, and gastrointestinal allergy in 11 per cent.

Scratch or puncture skin tests were performed with ingestants and inhalants in all patients. Intracutaneous skin testing was reserved for those patients who were suspected of being sensitive to inhalants, especially when environmental control alone was not effective. Elimination diets were tried in almost all cases. Food allergy was found to be the etiologic factor in 44

per cent of the cases and was associated with inhalant allergy in 41 per cent. Inhalant allergy alone was the causative factor in 15 per cent of the cases. Treatment included careful elimination of offending foods, environmental control, inhalant desensitization, and vaccine therapy for secondary infection. Good results were obtained in 84 per cent of the cases. The author stresses the importance of inhalant factors, including pollen, in the causation of atopic dermatitis. J. S.

Tissue Culture Studies on Human Skin. II. Comparative Effects of Certain Specific Contact Allergens on Sensitized and Nonsensitized Human Skin. Everett, E. T., Livingood, C. S., Pomerat, C. M., and Hu, F.: J. Invest. Dermat, **18**: 193, 1952.

Human skin explants were prepared from patients known to be sensitive to Rhus oleoresin to 2:4-dinitrochlorobenzene, or to old tuberculin. A large number of 2 mm. square samples were prepared from these subjects and an equal number of control samples were taken from nonsensitive individuals. "The explants were imbedded in clots containing varying concentrations of the substances until the smallest quantity required to effect total inhibition of outgrowth was determined. This quantity was designated as the minimal inhibitory dose or MID. Similar titrations indicated the smallest quantity required to produce the first evidence of injury as compared to an untreated control. This amount was labelled the least injurious dose or LID." After the sensitized and control tissue explants were exposed to each allergen, it was found that, although the LID or MID was different for each antigen, the amount of specific antigen required was the same for explants from sensitized or normal control skin. Thus 40 to 50 mg./ml. of old tuberculin was the MID for both sensitized and normal control explants and only 10 to 12.5 mg./ml. of old tuberculin was the LID for normal and sensitized skin explants. The authors conclude that specific contact allergen in the culture medium caused no greater inhibition of the outgrowth of epithelial cells in the explants from sensitive patients than occurred in the explants from nonsensitive individuals. R. W.

Otorhinology and Ophthalmology

Modern Trends in Otolaryngology With Special Emphasis on Allergy. Ashley, R. E.: Ann. Otol., Rhin. & Laryng. **60**: 525, 1951.

Six patients with asthma, chronic allergic rhinitis and nasal polyps were treated with ACTH and cortisone with excellent results. The pale, edematous nasal mucosa became pink in color. Polyps disappeared or grew smaller. Turbinates were reduced in size. Nasal eosinophilia decreased. Postnasal secretions diminished. These changes are attributed to "hormonal stimulation of the sympathetic nervous system to a point at which it gains dominance over the already overstimulated parasympathetic system, thus re-establishing the normal autonomic balance." C.

Pyribenzamine in the Treatment of Nonspecific Upper Respiratory Infections. Cronk, G. A., and Marty, F. N.: New York State J. Med. **52**: 579, 1952.

Four hundred sixty-three patients with nonspecific upper respiratory infections were treated with 200 mg. of Pyribenzamine daily or with a placebo. Only those cases which showed objective evidence of infection were included in the study. Sixty-six per cent of the Pyribenzamine-treated group had subjective improvement within 48 hours. Forty per cent of the control group

responded similarly. This difference was considered statistically significant. Those cases having their onset or primary location of infection in the nose showed a slightly larger per cent of symptomatic response than did pharyngeal or bronchial cases. The data suggests that a significant proportion of "colds" are allergic reactions which respond favorably to antihistaminic drugs. B. S.

Role of Allergy in Otology. Jordan, R. E.: Arch. Ophth. **55**: 363, 1952.

A study of the incidence of allergy in otologic practice is presented. In 27 per cent of 727 patients, the otologic condition was caused by or complicated by allergy. Seventeen per cent of 47 cases of chronic otitis externa and 87 per cent of 111 cases of chronic secretory otitis media were found to be allergic in origin. The author believes that Meniere's syndrome is due to an allergic reaction of the inner ear. Ten of 17 cases of chronic mastoiditis which failed to clear up following radical mastoidectomy were found to be allergic. In all except 3 of these cases the cavity became dry after allergic treatment. C.

Some Aspects of Allergic Maxillary Sinusitis With Special Consideration of Latent Allergy. Strömme, O.: Ann. Otol., Rhin. & Laryng. **60**: 336, 1951.

A new cyto-histologic method for determining the existence of eosinophilia in antral secretions is described. The fluid obtained from antral irrigation is homogenized, centrifuged and the sediment treated histologically. Sections are stained with May-Grünwald-Giemsa stain or with Chromotrope 2R. A 5 micron section shows the cells evenly distributed in a single layer as in a routine tissue preparation and permits recording the percentage of eosinophiles. Seven per cent or more is regarded as being of diagnostic significance in allergy. Eighteen per cent of 78 unselected patients with acute or subacute maxillary sinusitis had marked eosinophilia in their antral washings. Subsequent allergic investigation in 8 of these patients revealed evidence of allergy in all except one. C.

Allergy of the External Ear. Hansel, F. K.: Tr. Am. Acad. Ophth. March-April, 1952; p. 197.

Allergy of the external ear usually occurs in the form of dermatitis usually of the contact or atopic type. The auricle is more commonly involved than the canal. Contact dermatitis is more common than eczema and the offender can usually be determined by the history and by patch tests with the suspected substance. Involvement of the auricle may be associated with nail polish dermatitis and also frequently follows contact with nickel-containing spectacles in plastic frames. The auditory canal is frequently involved in sensitization to medicaments applied topically or taken orally. The treatment of these conditions is discussed. C.

Miscellaneous Allergies

Dry Rot as a Cause of Allergic Complaints. Frankland, A. W., and Hay, M. J.: Acta Allergologica **4**: 186, 1951.

The most common fungus occurring in damp houses is *Merulius lacrymans,* the cause of dry rot. This fungus spores during the months of August, September, and October. Preliminary studies suggest that there is a seasonal exacerbation of asthma during the sporing months, although the spores

are present in house dust at all times of the year. Old houses are especially affected, but the fungus is also found in new ones in which unseasoned or untreated wood has been used.

Of 75 patients tested by the prick method with dry rot extract, 12 showed positive reactions. Eight positive reactions were found in 25 patients tested by the intracutaneous technique. Positive clinical reactors were present in both groups. Positive passive transfer reactions were obtained in 2 patients with clinical histories suggestive of fungus allergy. H.

Thiamine Intolerance. Jaros, S. H., Wnuck, A. L., and deBeer, E. J.: Ann. Allergy **10**: 291, 1952.

Reactions to thiamine present many signs and symptoms suggestive of allergy or anaphylaxis. However, there is experimental and clinical evidence which indicates that these reactions are actually due to chemical toxicity rather than to hypersensitivity. Pharmacologically, thiamine possesses a "curare-like" action upon the autonomic ganglia, especially the parasympathetics. In many respects it resembles and is closely associated with acetylcholine. Since acetylcholine is known to play a role in the pathogenesis of the "hypersensitive state," it is likely that thiamine overdosage produces a reaction principally through the formation of excessive amounts of acetylcholine and possibly some histamine. The toxic effects of thiamine are unaffected by the antihistaminics but are reversed by epinephrine. The incidence of reactions to thiamine is no greater among allergic than among nonallergic individuals. This vitamin, which is so widely present in the body and which is used so extensively, is very likely not a sensitizer at all, but produces toxic reactions when given in overdosage. F.

Anaphylaxis

Similarities in the Mechanisms Determining the Arthus and Shwartzman Phenomena. Stetson, C. A., Jr.: J. Exper. Med. **94**: 347, 1951.

Rabbits were sensitized with repeated intracutaneous injections of ovalbumin until a well-defined Arthus reaction resulted. The degree of aerobic glycolysis was determined in skin from sacrificed sensitized animals, removed at various intervals after the intracutaneous injection of antigen. Normal skin from the same animal served as a control. A progressive increase in aerobic glycolysis which began one hour after the injection of antigen and continued to the third hour was noted. Determinations beyond this time were not made due to the presence of hemorrhage and necrosis. When skin was excised from sensitized animals and incubated in vitro with ovalbumin, no increase in aerobic glycolysis occurred. Shortly after the intracutaneous injection of antigen a marked leukopenia was noted in the peripheral blood, particularly affecting the granulocytes. This effect was maximal in 15 minutes and normal blood counts were obtained at the end of one hour. Normal rabbits failed to show a leukopenia following similar injections. Ovalbumin when added to blood from sensitized rabbits in vitro is known to produce clumping of leukocytes and platelets. Next, rabbits sensitized to ovalbumin were prepared for the Shwartzman phenomenon by the intracutaneous injection of meningococcal toxin. Twenty-four hours later, ovalbumin was injected in a distant skin site. Both the Shwartzman site and the Arthus sites reacted within 24 hours with the production of similar hemorrhagic and necrotic lesions. The Shwartzman reaction was well developed at one hour, whereas the Arthus site required from 3 to 4 hours for corresponding develop-

ment. Histologic study of skin removed from the albumin-injected area one hour after the intracutaneous injection of ovalbumin in sensitized animals showed perivascular accumulations of polymorphonuclear leukocytes around capillaries and small veins. At 2 hours, this infiltration was increased and thrombi composed of leukocytes and platelets were noted in capillaries and small veins. At 4 hours virtually all the capillaries and small veins of the area were thrombosed and larger veins were also involved. Gross hemorrhage and necrosis were evident and microscopic necrosis of vessel walls was observed. There was a close resemblance between these changes and those occurring during the Shwartzman phenomenon. The Shwartzman phenomenon can be inhibited by nitrogen mustard because of the removal of polymorphonuclear leukocytes from the circulation. This experiment was repeated on ovalbumin-sensitized rabbits, a single dose of nitrogen mustard being given. After 4 days when severe leukopenia had developed, the intracutaneous injection of ovalbumin resulted in no reaction for 24 hours, nodular lesions during the second and third days, and extensive hemorrhage and necrosis leading to the deaths of the animals within 4 days. In control rabbits not treated with nitrogen mustard, the typical Arthus reaction reached maximal proportions in 5 hours and subsided over the next 2 days.

It is concluded that the mechanism of the Arthus phenomenon is similar to that of the Shwartzman phenomenon; namely, the production of an abnormal metabolic process involving increased aerobic glycolysis in the injected area, perivascular accumulations of polymorphonuclear leukocytes, and the clumping of platelets and leukocytes in the blood vessels resulting in local thrombosis and hemorrhage. K.

Protease Activation in Immune Reactions. Geiger, W. B.: J. Immunol. **68**: 11, 1952.

It has been suggested that activation of protease enzymes following the injection of antigen into a sensitized animal may be one of the intermediate biochemical events leading to anaphylaxis. On the basis of this theory, rabbits were sensitized intravenously with various antigens. About 10 days following the last sensitizing injection the animals were bled and plasma obtained for protease assay. Assays were done on plasma samples treated with the specific antigen and also on samples not treated with antigen. A definite increase in protease activity was observed in the plasma to which antigen had been added. Frequently, the activity of antigen-treated samples was twice that of samples not treated with antigen. Not all antigens produced the same response. Those most active in producing this effect were Fractions II and V of bovine plasma, Fraction II of porcine plasma, fava-bean vicillin, and sheep cells. Crystallized egg albumin failed to increase protease activity, although sera from these animals contained precipitin. Control experiments showed that the addition to plasma of saline, buffers, or solutions of proteins to which the rabbits had not been sensitized failed to produce activation. Similarly, the addition of protein antigens to plasma of unsensitized rabbits usually failed to cause activation or inhibition. Antigens were shown to be free of protease activity. The author calls attention to the fact that the extent of activation with the specific antigen is usually less than that obtained with streptococcal fibrinolysin and that destruction of the protease inhibitor was necessary before protease activation could be clearly demonstrated. For these reasons, the author concludes that the anaphylactic reaction in rabbits probably cannot be attributed solely to activation of plasma protease by antigen. R. W.

Pharmacology, Physiology, and Pathology

Arteritis, Carditis, Glomerulonephritis and Bilateral Renal Cortical Necrosis Induced in Rabbits. By Injection of Horse Serum or Bovine Gamma Globulin Combined with Killed Group A Streptococci or Freund's Adjuvant. More, R. H., and Kobernick, S. D.: Arch. Path. **51**: 361, 1951.

Groups of rabbits were injected as follows: (a) horse serum combined with killed and dried group A beta hemolytic streptococci intravenously; (b) bovine gamma globulin combined with killed and dried group A beta hemolytic streptococci intravenously; (c) horse serum and Freund's adjuvant intramuscularly; (d) bovine gamma globulin and Freund's adjuvant intramuscularly; (e) killed and dried group A beta hemolytic streptococci and Freund's adjuvant intramuscularly. Freund's adjuvant, when combined with an antigen, is known to increase hypersensitivity. The animals were sacrificed at given intervals and the tissues were studied. The lesions found in groups (a), (b), (c), and (d) were quite similar. All showed necrotizing arteritis, glomerulonephritis, cardiac valvulitis, and myocarditis. No lesions occurred in group (e). Thus, all animals injected with serum proteins showed similar lesions, regardless of whether they received streptococci or not. A few animals injected with serum protein and streptococci showed bilateral renal cortical necrosis not seen in the animals which did not receive streptococci. The arterial lesions resembled those seen in human periarteritis nodosa. The glomerulonephritis was similar to that seen in the acute and subacute stages of the disease in human beings. The bilateral renal cortical necrosis also resembled that seen in human patients. The valvulitis and myocarditis found in these animals did not resemble the lesions found in human rheumatic fever closely enough to make a valid analogy. J. S.

Localization of the Nephrotoxic Antigen Within the Isolated Renal Glomerulus. Krakower, C. A., and Greenspon, S. A.: Arch. Path. **51**: 629, 1951.

It has previously been shown that the kidney contains a specific antigen which resides within the cortex to the renal glomerulus and that the antiserum of this antigen is nephrotoxic. In the present experiment, the various parts of isolated dog glomeruli were separated by sonic vibration utilizing low and then high voltage. By injecting the component parts of the glomerulus into different rabbits, specific antidog rabbit sera were obtained. Utilizing these sera, it was found that the parietal epithelial cells of the glomerulus were not antigenic. The basement membrane and the visceral epithelial and endothelial cells were actively antigenic. The basement membrane was found to be twenty times more active antigenically than the other two. J. S.

In Vitro Effects of Cortisone on Mesodermal Tissue. Baldridge, G. D., Kligman, A. M., Lipnik, M. J., and Pillsbury, D. M.: Arch. Path. **51**: 593, 1951.

Cortisone showed no in vitro cytotoxic activity against human peripheral leukocytes, nor did it inhibit the proliferation of chick embryo fibroblasts in tissue cultures. The well-established in vivo eosinopenic and lymphopenic action of cortisone, as well as its ability to delay wound healing, cannot therefore be due to the drug itself, but must be explained on the basis of the interaction of cortisone and some other substance. J. S.

Possible Pathogenic Mechanisms Responsible for Human Periarteritis Nodosa. As Suggested by the Occurrence of Two Instances of This Disease in Association with Glomerulonephritis. Kipke, G. F., and Johnson, D. S.: Arch. Path. **51**: 387, 1951.

Two cases of periarteritis nodosa which occurred in patients with glomerulonephritis are presented. In one case, the arterial lesions were generalized; in the other, they were confined to the lungs. Both patients had hypertension, systemic in the former case, systemic and pulmonary in the latter. Both patients had had sulfonamide therapy.

The pathogenesis of the periarteritis nodosa is discussed. Three possible mechanisms are postulated: (1) the arteritis was due to a pathogenic process that was the same as that responsible for the glomerulonephritis; (2) it was the result of the hypertension; (3) it was an allergic reaction to sulfonamides.

The authors suggest that hypersensitivity, either alone or in conjunction with some other unknown factor, was the most probable underlying mechanism. J. S.

The Action of Dehydro-ascorbic Acid and Alloxan on Tuberculin Sensitivity in Guinea Pigs. Long, D. A., Miles, A. A., and Perry, W. L. M.: Lancet **2**: 902, 1951.

It has been previously shown that ascorbic acid markedly lessens tuberculin sensitivity in guinea pigs and that some factor in cabbage inhibits the desensitizing effect of natural cabbage ascorbic acid on the tuberculin reaction in guinea pigs. On the basis of these facts, guinea pigs were injected with B.C.G. and then maintained on a pelleted diet deficient in ascorbic acid, either with or without the supplementation of large amounts of cabbage. Tuberculin sensitivity was measured 20 days later. Ascorbic acid injected 2 hours prior to tuberculin testing diminished tuberculin sensitivity in the animals on the pelleted diet but not those on the cabbage-supplemented diet. Dehydro-ascorbic acid injected 2 hours prior to tuberculin testing diminished tuberculin reactions in animals on both types of diet. The injection of alloxan 2 hours before testing did not alter tuberculin reactions in guinea pigs on the pelleted diet but lessened the response obtained in the animals on the cabbage-supplemented diet. A 4-week course of propylthiouracil in the pigs maintained on a pelleted diet did not change the desensitizing effect of either ascorbic acid or of dehydro-ascorbic acid, but animals on the supplemented diet failed to develop the expected desensitization after an injection of alloxan. These results with alloxan are the same as those reported for ACTH and cortisone and seem to indicate that ACTH, cortisone, and alloxan are active only in the presence of thyroxine. Neither alloxan nor propylthiouracil had any effect on the desensitizing property of dehydro-ascorbic acid. It is suggested that dehydro-ascorbic acid, the first oxidation product of ascorbic acid, is a powerful antiallergic agent, but, since it is a diabetogenic substance, further investigation is needed before it can possibly be used in the treatment of humans. The authors conclude that ascorbic acid is probably active only in its oxidized form and that presumably an -SH compound is the factor in cabbage which inhibits the oxidation of ascorbic acid. R. W.

The Action of the Local Hormones on the Isolated Human Bronchus. Rosa, L. M., and McDowall, R. J. S.: Acta Allergologica **4**: 293, 1951.

Using a new technique, the authors studied the action of various drugs on the isolated bronchi from a normal person and from an asthmatic patient.

A piece of small bronchus, dissected from the human lung immediately after lobectomy or pneumonectomy, was refrigerated in Krebs solution. Quaternary bronchi were found most suitable and were dissected as a spiral or as a chain of bronchial rings. The chain technique proved most satisfactory for studying human bronchi which are too short to be cut into a spiral of sufficient length. The preparation was mounted in a bath of Krebs solution maintained at 37.5° C. and aerated with a mixture of 5 per cent CO_2 plus 95 per cent O_2. The free end was attached to the short arm of a kymograph lever and the end of the bronchial strip was fixed at the bottom of the chamber. The bronchus remained active after 24 to 48 hours in refrigerated storage.

Histamine and acetylcholine caused a marked and lasting contraction proportional to the concentration of the drug. Adrenalin induced a marked relaxation, but its action was temporary. Adrenalin also temporarily abolished the contraction produced by histamine and acetylcholine. The sensitivity of the bronchus preparation to adrenalin was extremely high, relaxation being produced by 1×10^{-8}. The addition of ascorbic acid solution to the bath after adrenalin resulted in a more powerful and more prolonged relaxation effect. Ephedrine, although much less active than adrenalin, showed a more lasting and more permanent action. Atropine in concentrations of 1:1,000,000 and 1:100,000 failed to relax the human bronchus, but it antagonized the acetylcholine action. The antihistamine drugs antagonized the histamine action.

In another experiment, the bronchus strip was obtained from the lung of an asthmatic patient who underwent a pneumonectomy for a cancer which occluded the main bronchus. The patient was a miller with marked cutaneous reactions to flour dust. The addition of 1.0 c.c. of flour dust extract to the bath containing the bronchial chain preparation produced a marked and lasting contraction. A histamine-like substance was isolated from the bath solution. A second addition of antigen produced no reaction. The strip obtained from the atopic individual and strips from nonatopics gave similar reactions to the various drugs tested. H.

The Effect of the Chronic Administration of Adrenal Medullary Hormones to Man on Adrenocortical Function and the Renal Excretion of Electrolytes. Duncan, L. E., Jr., Solomon, D. H., Nichols, M. P., and Rosenberg, E.: J. Clin. Investigation **30**: 908, 1951.

Four men were injected subcutaneously with 0.4 mg. of adrenaline in saline every 4 hours for 3 days, followed by 1.0 mg. of adrenaline in peanut oil intramuscularly every 4 hours for another 3 days. Detailed metabolic studies were carried out for a base-line period of 3 days prior to administration of the above medication and for 4 to 6 days after cessation of therapy. The following effects of adrenaline therapy were observed: a decrease in concentration of circulating eosinophiles 4 hours after the first injection, no change in 17-ketosteroid excretion, a slight increase in urinary uric acid excretion, an increase in plasma glucose (15 mg./100 c.c.) and urinary glucose (1.2 Gm./day). There was no consistent change in urinary excretion of sodium and chloride while adreanline in saline was administered, but following the administration of adrenaline in oil there was increased excretion of these elements. Oil alone did not cause this change. The urinary excretion of potassium was the reverse of that for sodium, there being decreased potassium excretion during the administration of adrenaline in oil. There were no consistent changes in the plasma levels for sodium, potassium, or chloride. "Urinary calcium excretion and concentration were increased during the en-

tire period of administration of adrenaline and fell to values below the control levels after withdrawal of adrenaline." Urinary excretion of nitrogen and phosphorus was unaffected and changes in urinary volume were small. All subjects lost weight, but this was regained during the recovery period and was possibly due to changes in body water. Plasma protein increased slightly. Hematocrit, serum non-protein nitrogen phosphorus, bicarbonate and pH were not consistently affected, nor were the values for urinary creatinine or pH. Pulse rate averaged a 3-beat per minute increase and blood pressure averaged a 2 mm. of mercury increase in systolic and a 2 mm. decrease in the diastolic pressure one hour previous to a dose of adrenaline.

It was concluded that the doses used provided only a very weak stimulus to adrenal cortical activity, and affected renal excretion by some mechanism other than stimulating adrenal cortical hormone. The excretion of sodium and retention of potassium is of particular interest in this regard. K.

Miscellaneous

The Persistence in Mice of Certain Foreign Proteins and Azoprotein Tracer Antigens Derived from Them. McMaster, P. D., and Kruse, H.: J. Exper. Med. **94**: 323, 1951.

Bovine gamma globulin and human serum albumin were conjugated with a blue tracer dye and injected into mice. Blue particles were found to persist, especially in the reticuloendothelial system, for as long as 120 days. In order to determine whether the persistence of color meant persistence of active antigen, a technique using the delicate ear vascular response of mice during allergic reactions was devised. As little as 0.5 to 1.0 microgram of antigenic protein injected into the peritoneal cavity of a mouse can thus be detected by a subsequent intravenous injection of antiserum. The reactions which are described in minute detail include arterial contractions, spasm of the veins, slowing of blood flow, and hyperemia of the ears. Reversed passive anaphylaxis as well as direct anaphylaxis elicited these responses. Criteria for the differentiation of nonspecific vascular reactions are presented. Using this method to detect antigen, bovine gamma globulin was found to persist in the liver for 101 days and in the blood for 56 days. Both the azoprotein conjugate of human serum albumin and unconjugated human serum albumin were found to be present and antigenically active 36 to 44 days after injection. As long as blue color remained grossly visible in the tissue, tests for antigen were positive. The persistence of different proteins varied, being consistently less for human serum albumin than for bovine gamma globulin. The persistence of colored material (azoprotein) resembled that of the parent protein. After the ear vascular response could no longer be elicited, blue particles could still be seen with the microscope in Küpffer and endothelial cells. It is suggested that the prolonged persistence of antigen in the body, even after it can no longer be detected in the blood, gives an explanation for prolonged antibody formation. K.

The Use of Adjuvants in Studies on Influenza Immunization. I. Measurements in Monkeys of the Dimensions of Antigenicity of Virus-Mineral Oil Emulsions. Salk, J. E., and Laurent, A. M.: J. Exper. Med. **95**: 429, 1952.

Influenza virus in small quantities was prepared in an emulsion consisting of a mineral oil of low viscosity and a nonirritating emulsifier (mannide monooleate). This preparation was injected intramuscularly into Rhesus

monkeys. Histologic studies revealed good dispersal of this emulsion among muscular fibers accompanied by a monocytic-lymphocytic cellular reaction, but there was no tendency for the material to be walled off into a cyst. Studies were made up to one year after injections. Antibody production was measured by the hemagglutination inhibition technique, virus neutralization tests in ovo, and complement fixation tests. Much higher antibody levels were obtained with antigen in adjuvant than with antigen in saline and the persistence time was increased. The adjuvant hastened rather than slowed antibody production in the first week after injection. When the dose of virus was held constant and the volume of the inoculation was varied from 1.0 ml. to 0.1 ml., there was no difference in antibody production. As the dose of virus was increased in tenfold dilutions, antibody response was increased. A thousandfold difference in quantity of antigen injected, however, influenced the mean antibody level only tenfold. Virus in adjuvant induced measurable antibody formation when diluted one hundred-thousandfold, whereas virus in saline when diluted more than tenfold resulted in little or no antibody formation. It was noted that the rates of formation were different for hemagglutination (in ovo). The adjuvant described above potentiates all 3 types of antibody responses. It is suggested that "the antigen in oil is retained at the site of inoculation and antibody producing cells are brought to it by the chemotropic influence of the constituents of the emulsion." K.

Oral Administration of Cortisone in a Case of Erythema Nodosum. Ureles, A. L., and Kalmansohn, R. B.: New England J. Med. **245**: 139, 1951.

A 28-year-old man with allergic rhinitis and positive skin reactions to dust, ragweed, goldenrod, horse dander, and dog dander failed to respond to hyposensitization therapy. Antihistamines afforded relief but were discontinued 6 months prior to the onset of erythema nodosum. For several months he had received urea and quinine injections for hemorrhoids. The family history was positive for allergy. The patient was admitted because of erythema nodosum of undetermined origin which involved the lower extremities and which had been present for 4 weeks. There was an extensive hilar mediastinal lymphadenopathy. Repeated courses of acetylsalicylic acid, tripelennamine, and penicillin had no effect. Oral administration of 100 mg. of cortisone twice daily was begun on the tenth hospital day. There was a dramatic response with relief of pain, rapid fading of skin lesions, and a fall in temperature within 12 hours after the initial dose. When the dose was gradually reduced to 25 mg. twice daily, there was a recrudescence which cleared promptly as the dose was increased. He was then maintained on 75 mg. per day. After 3 weeks, the drug was discontinued and the patient has remained asymptomatic and afebrile for 2 months. I. Glazer

Benign Paroxysmal Peritonitis. Surgical and Histologic Findings. Brick, I. B., and Cajigas, M.: New England J. Med. **244**: 786, 1951.

The case of a 38-year-old man with benign paroxysmal peritonitis is reported. The attacks were characterized by abdominal pain, fever, and leukocytosis, but there was no increase in the total blood eosinophiles. A laparotomy performed at the height of one attack revealed a moderate amount of cloudy peritoneal fluid and fibropurulent exudate over the dome of the liver and the parietal peritoneum. There was no evidence of a bacterial infection and no eosinophiles were found in the peritoneal exudate. A liver

biopsy showed extensive fatty metamorphosis. In the opinion of the authors, the condition is due to an acute localized peritonitis and is not allergic in nature. I. Glazer

The Cellular Transfer in Humans of Delayed Cutaneous Reactivity to Hemolytic Streptococci. Lawrence, H. S.: J. Immunol. **68**: 159, 1952.

Four hundred seventy-two patients without apparent streptococcal disease or its complications were tested with intact streptococcal cells, M substance, or with a combination of streptokinase and streptodornase. Approximately 45 per cent of the patients manifested positive delayed cutaneous reactions to these test substances. Viable leukocytes were obtained from the heparinized blood of those subjects exhibiting the most active reactions to the streptococcal antigens by a modification of the author's previously described technique. The washed viable leukocytes were injected intracutaneously into the skin overlying the shoulders of the streptococcus-negative recipients. The test material was injected intracutaneously into the flexor surface of the opposite forearm 24 hours after the injection of the leukocytes. Readings of the reactions to the challenging streptococcal skin tests were made at 15 minutes and at 24, 48, 72, and 96 hours. Maximal responses were usually observed at 24 or 48 hours after the challenging skin tests. In 14 instances, generalized cutaneous reactivity of the delayed type was induced in streptococcus-negative recipients by the injection of viable leukocytes from streptococcus-positive donors. Of these, 6 subjects showed positive delayed reactions to SK-SD, 4 recipients reacted positively to intact streptococcal cells, 3 became positive to M substance, while 1 subject developed reactivity to all three streptococcal materials. The induced generalized cutaneous reactivity was shown to be a transient phenomenon which gradually decreased during a period of one or two months. The possibility that the streptococcal materials contained a common immunologically active contaminant substance, by itself capable of inducing delayed cutaneous reactions, was ruled out. The author states that the leukocytic transfer of delayed cutaneous sensitivity to hemolytic streptococcal materials in human beings gave results very similar to those already demonstrated in human beings with the use of tuberculin as the challenging substance. R. W.

AUTHORS INDEX—ALLERGY ABSTRACTS

A

Adair, C. V., Woodin, W. G., and Bunn, P. A., *7*
Aikawa, J. K., and Harrell, G. T., *22*
Alin, K., *14*
Allende, M. F. (*See* Falk, M. S., et al.),
Allman, R. M. (*See* Goth, A., et al.),
Alpert, S. (*See* Ferris, H. E., et al.)
Ambrus, C. M. (*See* Ambrus, J. L., et al.)
Ambrus, J. L., Ambrus, C. M., and Harrisson, J. W. E., *25, 43*
Andem, M. R. (*See* Haley, T. J.)
Anderson, G. E., Wiesel, L. L., Hillman, R. W., and Stumpe, W. M., *27*
Andreasen, A. P. (*See* Christensen, R.)
Aptekman, P. M. (*See* Lewis, M. R.)
Apthorp, J., *32*
Arner, B., Wiholm, S., and Oehnell, L., *2*
Arnoldsson, H., and Pipkorn, H., *18*
Ashley, R. E., *36, 87*
Astwood, E. B. (*See* Raben, M. S., et al.)
Axelrod, A. E. (*See* Ludovici, P. P.)
Ayres, S., III, and Ayres, S., Jr., *31*
Ayres, S., Jr. (*See* Ayres, S., III)

B

Bacchus, H., *40*
Baer, R. L., and Sulzberger, M. B., *68*
—. (*See* Sulzberger, M. B., et al.)
Baggenstoss, A. H., Shick, R. M., and Polley, H. F., *59*
Baldridge, G. D., and Kligman, A. M., *52*
—, —, Lipnik, M. J., and Pillsbury, D. M., *91*
Banton, H. J. (*See* Edsall, G., et al.)
—. (*See* Pappenheimer, A. M., Jr., et al.)
Barach, A. L., *50*
Bayles, T. B. (*See* Vaughan, J. H., et al.)
Beck, G. J. (*See* Mundy, W. L., et al.)
Beinhauer, L. G., Thomas, G. J., and Perrin, S. R., *82*
Bellet, S. (*See* Samitz, M. H., et al.)
Belman, S. (*See* Eisen, H. N., et al.)
Benacerraf, B. (*See* Halpern, B. N., et al.)
Bennett, I. L. (*See* Cluff, L. E.)
Bennett, I. L., Jr., *72*
Bennett, J. H. (*See* Falk, M. S., et al.)
Bereston, E. S., *67*
Berkowitz, B. (*See* Sherago, M., et al.)
Bernstein, D., *21*
Bickerman, H. A. (*See* Mundy, W. L., et al.)
Biewell, S. M. R., and Boyd, E. M., *61*
Bigg, E. (*See* Feinberg, S. M., et al.)
Bigler, J. A. (*See* Fager, D. B., et al.)
Binaghi, R. A., *12*
Bincer, M. J., Gunderson, H. J., Cannon, J., and Rosove, L., *59*
Bjorneboe, M., *16*
—. (*See* Fischel, E., et al.)
Blatt, H., and Nantz, F. A., *45*
Böe, J., Linden, V., and Treit, J., *20*
Bonner, C. D., *44*
Booher, R. J., and Grant, R. N., *63*
Booth, A. N. (*See* Wilson, R. H., et al.)
Bordley, J. E., *55*
Boroff, D. A., *38*
Boutourline-Young, H. J., and Whittenberger, J. L., *1*
Bowman, W. M., Mayer, M. M., and Rapp, H. J., *42*
Boyd, E. M. (*See* Bidwell, S. M. R.)
Boyden, S. V., *30*
Braaf, M. M., *9*
Bradford, J., *81*
Braunsteiner, H., Pakesch, F., and Vetter, H., *28*
Brick, I. B., and Cajigas, M., *95*
Briot, M. (*See* Halpern, B. N., et al.)
Bukantz, S. C. (*See* Talmage, D. W., et al.)
Bunn, P. A. (*See* Adair, C. V., et al.)
Burgoon, C. F. (*See* Shaffer, B., et al.)
Burkhardt, R. (*See* Rosenthal, M. D., et al.)

C

Cajigas, M. (*See* Brick, I. B.)
Cameron, G. (*See* Mitchell, H. S.)
Cannon, J. (*See* Binder, M. J., et al.)
Caulson, E. J. (*See* Sherman, W. B.)
Chen, K. K. (*See* Lee, H. M.)
Chitwood, W. R., and Moore, C. D., *37*
Christensen, R., and Andreasen, A. P., *37*
Churg, J., and Strauss, L., *70*
—. (*See* Strauss, L., et al.)
Cluff, L. E., and Bennett, I. L., *62*
Coakley, C. S. (*See* Ferris, H. E., et al.)
Code, C. F. (*See* Dews, P. B.)
Cohen, A. E., *63*
Cohen, M. M. (*See* Robinson, H. M., Jr., et al.)
Cohen, S. G., *35*
—, and Moses, C., *70*
—. (*See* Criep, L. H.)
Colovos, G. C. (*See* Zindler, G. A.)
Coons, A. H. (*See* Hill, A. G. S., et al.)
Cormia, F. E., *86*
Crampton, C. F. (*See* Haurowitz, F.)
Crawford, T., and Nassim, J. R., *39*
Crepea, S. B., Magnin, G. E., and Seastone, C. V., *78*
Criep, L. H., and Cohen, S. G., *85*
Cronk, G. A., and Marty, F. N., *87*
—, and Naumann, D. E., *83*
Cruickshank, C. H. D., *47*
Curtis, G. H., *66*
Curtis, G. M. (*See* Klassen, K. P., et al.)
Curtiss, W. P. (*See* Usndek, H. E., et al.)

D

Daikos, G., and Weinstein, L., *63*
Dalton, J. E., *55*
Dameshek, W. (*See* Rosenthal, M. C., et al.)
Dammin, G. J. (*See* Talmage, D. W., et al.)
David, N. A. (*See* McCawley, E. L., et al.)
Deane, H. W. (*See* Hill, A. G. S., et al.)
deBeer, E. J. (*See* Jaros, S. H., et al.)
DeEds, F. (*See* Wilson, R. H., et al.)
Denny, F. W. (*See* Hahn, E. O., et al.)
Derbes, V. J., White, R. V., Teverbaugh, J., Vaughan, D. D., and Weaver, N. K., *51*
D'Ermo, F., *21*, *25*
—, and Salvi, G., *28*
—, and Santorocco, N., *21*
deVries, J. A., (*See* Kobernick, S. D., et al.)
Dews, P. B., and Code, C. F., *38*
DiGeorge, A., and Nelson, W. E., *5*
DiLapi, M. M. (*See* Heidelberger, M., et al.)
Dixon, F. J., and Talmage, D. W., *77*
—. (*See* Talmage, D. W., et al.)
Dobkevitch-Morrill, S. (*See* Sidi, E.)
Domonkos, J. (*See* Huszak, I.)
Dougherty, T. F. (*See* Hayes, S. P., et al.)
Doyle, J. T., Wilson, J. S., Estes, E. H., and Warren, J. V., *25*
Dragsted, P. J. (*See* Jenson, K. A., et al.)
Duffy, B. J., Jr., and Morgan, H. R., *77*
Duncan, L. I., Jr., Solomon, D. H., Nichols, M. P., and Rosenberg, E., *93*
Duque, I. (*See* Grau, J., et al.)

E

Edsall, G., Banton, H. J., and Wheeler, R. E., *15*
—. (*See* Pappenheimer, A. M., Jr., et al.)
Eisen, H. N., Orris, L., and Belman, S., *84*
Epstein, E., *53*
Epstein, S., *35*
Erslev, A., *27*
Estes, E. H., (*See* Doyle, J. T., et al.)
Everett, E. T., Livingood, C. S., Pomerat, C. M., and Hu, F., *87*
Eyster, W. H., Jr., Roth, G. M., and Kierland, R. R., *68*

F

Fager, D. B., Bigler, J. A., and Simonds, J. P., *71*
Falk, M. S., Allende, M. F., and Bennett, J. H., *83*
Farmer, L. (*See* Kaufman, R. E.)
Favour, C. B. (*See* Osgood, C. K.)
—. (*See* Vaughan, J. H., et al.)
Feinberg, A. R. (*See* Feinberg, S. M., et al.)
Feinberg, S. M., Feinberg, A. R., and Bigg, E., *8*
Fellows, E. J., and Macko, E., *82*
Ferguson, J. H., *27*
Ferris, H. E., Alpert, S., and Coakley, C. S., *64*
Fischel, E., Stoerk, C., and Bjrneboe, M., *42*
Fishman, A. E., *34*
Fitzgerald, J. D. L. (*See* McLean, C. R., et al.)
Fleming, J. W. (*See* Witham, A. C.)
Forman, B. (*See* Woodruff, M.)
Fox, C. L., Jr., (*See* Nelson, C. T., et al.)
Frankel, A. L., and Rothermich, N. O., *23*
Frankland, A. W., and Hay, M. J., *88*
Fredericksen, E. (*See* Jenson, K. A., et al.)
Freedberg, A. S. (*See* Kurland, G. S.)
Freeman, E. B. (*See* Nelson, C. T., et al.)
Friedman, T. B. (*See* Lichtenstein, G. M.)
Frobisher, M., Jr., and Parsons, E. I., *80*

G

Gabrieli, E. R., *73*
Gebhardt, L. P. (*See* Hayes, S. P., et al.)
Geiger, W. B., *90*
Gitlin, D. (*See* Lotta, H., et al.)
Gittell, G., *24*
Goerke, L. S., *13*
Goldberg, H. (*See* Silber, E. N., et al.)
Goldman, L., Preston, R., and Rockwell, E., *54*
Goodell, H. (*See* Graham, G. T., et al.)
Goodman, M. (*See* Makinodan, T., et al.)
Gordon, E. T., *46*
Gosman, J. H. (*See* Shaffer, B., et al.)
Goth, A., Allman, R. M., Merritt, B. C., and Holman, J., *60*
Graham, G. T., Goodell, H., and Wolff, H. G., *11*
Grant, R. N. (*See* Booher, R. J.)
Grau, J., Larrain, C., and Duque, I., *48*
Greenspon, S. A. (*See* Krakower, C. A.)
Groen, J. (*See* Riesel, J. H.)
Gruber, S. (*See* Sternberg, S. D., et al.)
Guerrant, J. L., and Hollifield, W. C., *35*
Guiducci, A. (*See* Monash, S.)
Gunderson, H. J. (*See* Binder, M. J., et al.)

H

Hackel, D. B. (*See* Winternitz, W. W.)
Hahn, E. O., Houser, H. B., Rammelkamp, C. H., Jr., Denny, F. W., and Wannamaker, L. W., *14*
Hahn, P., and Poupa, O., *76*
Haley, T. J., and Andem, M. R., *58*
—, and Stolarsky, F., *13*
Halpern, B. N., Benacerraf, B., and Briot, M., *74*
Hamilton, J. D. (*See* McLean, C. R., et al.)
Hansel, F. K., *88*
Harrell, G. T. (*See* Aikawa, J. K.)
Harrisson, J. W. E. (*See* Ambrus, J. L., et al.)
Haurowitz, F., and Crampton, C. F., *75*
Havens, W. P., Jr., Shaffer, J. M., and Hopke, C. J., Jr., *44*
Hawkins, D. F. (*See* Schild, H. O., et al.)
Haxthausen, H., *84*
Hay, M. J. (*See* Frankland, A. W.)
Hayes, S. P., Dougherty, T. F., and Gebhardt, L. P., *13*

Heidelberger, M., MacLeod, C. M., Markowitz, H., and DiLapi, M. M., *30*
Heise, H. A., *49*
Herbert, W. C. (*See* Way, E. L.)
Herrmann, F. (*See* Sulzberger, M. B., et al.)
Herxheimer, H., *33*
—. (*See* Schild, H. O., et al.) *65*
Hill, A. G. S., Deane, H. W., and Coons, A. H., *29*
Hill, R. M. (*See* Holtkamp, D. E., et al.)
Hillman, R. W. (*See* Anderson, G. E., et al.)
Hollifield, W. C. (*See* Guerrant, J. L.)
Holman, J. (*See* Goth, A., et al.)
Holtkamp, D. E., Whitehead, R. W., and Hill, R. M., *41*
Hopke, C. J., Jr., (*See* Havens, W. P., Jr., et al.)
Horvath, P. (*See* Samitz, M. H., et al.)
Houser, H. B. (*See* Hahn, E. O., et al.)
Hu, F. (*See* Everett, E. T., et al.)
Hubbard, W. N., Jr., *79*
Hubl, P. (*See* Seelich, F.)
Hugentobler, F. (*See* Moeschlin, S., et al.)
Husted, J. R. (*See* Sheldon, J. M., et al.)
Huszak, I., and Domonkos, J., *43*

J

Jadassohn, W., and Suter, M., *83*
Jahiel, R., Jahiel, R., and Krakauer, J., *78*
—. (*See* Jahiel, R., et al.)
Janeway, C. A. (*See* Lotta, H., et al.)
Jaros, S. H., Wnuck, A. L., and deBeer, E. J., *89*
Jennes, S. W., *16*
Jenson, K. A., Dragsted, P. J., Kiaer, I., Nielsen, E. J., and Fredericksen, E., *47*
Johnson, D. S. (*See* Kipke, G. F.)
Jordan, R. E., *88*

K

Kalmansohn, R. B. (*See* Ureles, A. L.)
Kark, R. M. (*See* Muehrcke, R. C.)
—. (*See* Scudamore, H. H., et al.)
Katz, L. N. (*See* Silber, E. N., et al.)
Kaufman, M., *36*
Kaufman, R. E., and Farmer, L., *51*
Keeney, E. L., *82*
Kessel, J. F., and Pait, C. F., *79*
Kiaer, I. (*See* Jenson, K. A., et al.)
Kiel, H., *19*
Kierland, R. R. (*See* Eyster, W. H., Jr., et al.)
Kile, R. L., Rockwell, E. N., and Schwarz, J., *53*
King, B. D., Sokoloff, L., and Wechsler, R. L., *73*
Kipke, G. F., and Johnson, D. S., *92*
Klassen, K. P., Morton, D. R., and Curtis, G. M., *26*
Kligman, A. M. (*See* Baldridge, G. D.)
—. (*See* Baldridge, G. D., et al.)
Klovstad, O., *57*
Knobloch, J. D. (*See* Massell, B. F., et al.)
Kobernick, S. D., deVries, J. A., and More, R. H., *72*
—. (*See* More, R. H.)
Kohn, H. I., *29*
Koprowski, H., and LeBell, I., *8*
Kraft, L. M. (*See* Paul, J. R., et al.)
Krakauer, J. (*See* Jahiel, R., et al.)
Krakower, C. A., and Greenspon, S. A. *91*
Kretchmer, H. E. (*See* Sadove, M. S., et al.)
Krop, S. (*See* Landis, L.)
Kruse, H. (*See* McMaster, P. D.)
Kugelmass, I. N., *57*
Kurland, G. S., and Freedberg, A. S., *59*

L

Lain, E. S. (*See* Lamb, J. H.)
Lamb, J. H., and Lain, E. S., *35*
Landis, L., and Krop, S., *19*
Larrain, C., (*See* Grau, J., et al.)
Larson, D. L., and Tomlinson, L. J., *77, 79*
Latta, H., *12*
Laurent, A. M. (*See* Salk, J. E.)
Lawrence, H. S., *96*
—. (*See* Pappenheimer, A. M., Jr., et al.)
LeBell, I. (*See* Koprowski, H.)
Lecks, H. I., *45*
Lecomte, J., *48*
Lee, H. M., and Chen, K. K., *46*
Leibowitz, H., and Schwartz, E., *36*
Leifer, W., *4*
—, and Steiner, K., *20*
LeMaistre, C. A., Tompsett, R., Muschenheim, C., Moore, J. A., and McDermott, W., *39*
Lever, W. F., *85*
Lewis, M. R., and Aptekman, P. M., *8*
Lichtenstein, G. M., and Friedman, T. B., *22*
Lichterman, J. (*See* Sternberg, S. D., et al.)
Lima, A. O., *51*
Linden, I. H. (*See* Sternberg, T. H., et al.)
Linden, V. (*See* Böe, J., et al.)
Lipman, W. H., *33*
Lipnik, M. J. (*See* Baldridge, G. D., et al.)
Livingood, C. S. (*See* Everett, E. T., et al.)
Loewenthal, L. J. A., *18*
Long, D. A., Miles, A. A., and Perry, W. L. M., *28, 92*
Lotta, H., Gitlin, D., and Janeway, C. A., *26*
Lovell, R. G. (*See* Sheldon, J. M., et al.)
Ludovici, P. P., and Axelrod, A. E., *45*
—, and Axelrod, A. E., *48*

M

McAteer, D. A., *24*
McCawley, E. L., Weston, G. A., and David, N. A., *41*
McCulloch, H., and Zeligman, I., *23*
McDermott, W. (*See* LeMaistre, C. A., et al.)
McDowall, R. J. S. (*See* Rosa, L. M.)
McIntire, F. C., Roth, L. W., and Sproull, M., *39*
Macko, E. (*See* Fellows, E. J.)
McLean, C. R., Fitzgerald, J. D. L., Younghusband, O. Z. and Hamilton, J. D., *30*
MacLeod, C. M. (*See* Heidelberger, M., et al.)
McMaster, P. D., and Kruse, H., *94*

Magnin, G. E. (*See* Crepea, S. B., et al.)
Makinodan, T., Wolfe, H. R., Goodman, M., and Ruth, R., *71*
Markowitz, H. (*See* Heidelberger, M., et al.)
Marsh, R. R., and Tollotson, I. G., *85*
Marty, F. N. (*See* Cronk, G. A.)
Massell, B. F., Place, E. H., Sturgis, G. P., Prizer, M., Knobloch, J. D., and Shih-Man, C., *32*
Mathov, E., *6*
Matoltsy, A. G., and Matoltsy, M., *61*
Matoltsy, M. (*See* Matoltsy, A. G.)
Mayer, M. M. (*See* Bowman, W. M., et al.)
Menkin, V., *73*
Merritt, B. C. (*See* Goth, A., et al.)
Milberg, I. L. (*See* Sulzberger, M. B., et al.)
Miles, A. A. (*See* Long, D. A., et al.)
Milzer, A., Weiss, M. A., and Vanderboom, K., *45*
Mitchell, H. S., *71*
—, and Cameron, G., *66*
Moeschlin, S., Pelaez, J. R., and Hugentobler, F., *42*
Monash, S., and Guiducci, A., *52*
Mongar, J. L. (*See* Schild, H. O., et al.)
Moore, C. D. (*See* Chitwood, W. R.)
Moore, J. A. (*See* LeMaistre, C. A., et al.)
More, R. H., and Kobernick, S. D., *91*
—. (*See* Kobernick, S. D., et al.)
Morgan, H. R. (*See* Duffy, B. J., Jr.)
Morris, G. E., *67*, *85*
Morse, C. O., *15*
Morton, D. R. (*See* Klassen, K. P., et al.)
Moses, C. (*See* Cohen, S. G.)
Motley, H. L., and Tomashefski, J. F., *50*
Muehrcke, R. C., and Kark, R. M., *47*
Mundy, W. L., Walker, W. G., Bickerman, H. A., and Beck, G. J., *24*
Muschenheim, C. (*See* LeMaistre, C. A., et al.)

N

Nantz, F. A. (*See* Blatt, H.)
Nassim, J. R. (*See* Crawford, T.)
Naumann, D. E. (*See* Cronk, G. A.)
Neill, E. J. (*See* Usndek, H. E., et al.)
Nelson, C. T., Fox, C. L., Jr., and Freeman, E. B., *57*
Nelson, R. J., *71*
Nelson, W. E. (*See* DiGeorge, A.)
Newcomer, V. D. (*See* Sternberg, T. H., et al.)
Nichols, M. P. (*See* Duncan, L. E., Jr., et al.)
Nielsen, E. J. (*See* Jenson, K. A., et al.)
Nitzen, A., *53*

O

Oehnell, L. (*See* Arner, B., et al.)
Orris, L. (*See* Eisen, H. N., et al.)
Osgood, C. K., and Favour, C. G., *26*

P

Pait, C. F. (*See* Kessel, J. F.)
Pakesch, F. (*See* Braunsteiner, H., et al.)
Pappenheimer, A. M., Jr., Edsall, G., Lawrence, H. S., and Banton, H. J., *15*
Parsons, E. I. (*See* Frobisher, M., Jr.)
Pascher, F., and Wolf, J., *34*
Paul, J. R., Riordan, J. T., and Kraft, L. M., *32*
Pearce, J. W., and Whitteridge, D., *58*
Peck, S. M., *5*
Pelaez, J. R. (*See* Moeschlin, S., et al.)
Pelner, L., and Waldman, S., *49*, *62*
Pepys, J., *69*
Perlman, E., *3*
Perrin, S. R. (*See* Beinhauer, L. G., et al.)
Perry, W. L. M. (*See* Long, D. A., et al.)
Piekarski, J. W., *3*
Pillsbury, D. M. (*See* Baldridge, G. D., et al.)
Pipkorn, H. (*See* Arnoldsson, H.)
Place, E. H. (*See* Massell, B. F., et al.)
Polley, H. F. (*See* Baggenstoss, A. H., et al.)
Polymenakos, L. G., *9*
Pomerat, C. M. (*See* Everett, E. T., et al.)
Poupa, O. (*See* Hahn, P.)
Preston, R. (*See* Goldman, L., et al.)
Prizer, M. (*See* Massell, B. F., et al.)

R

Raben, M. S., Rosenberg, I. N., Westermeyer, V. W., and Astwood, E. B., *62*
Radner, D. B. (*See* Silber, E. N., et al.)
Rammelkamp, E. H., Jr. (*See* Hahn, E. O., et al.)
Rapp, H. J. (*See* Bowman, W. M., et al.)
Reeves, G. A., *16*
Reicher, A. J., *19*
Reisel, J. H., and Groen, J., *31*
Reitman, M. (*See* Sherago, M., et al.)
Richards, A. B. (*See* Weille, F. L.)
Riordan, J. T. (*See* Paul, J. R., et al.)
Robinson, H. M., Jr., Zeligman, II, Shapiro, A., and Cohen, M. M., *52*
Rockwell, E. (*See* Goldman, L., et al.)
Rockwell, E. N. (*See* Kile, R. L., et al.)
Rogers, H. E. (*See* Weil, A. J.)
Roodenburg, A. I. (*See* Steinberg, C. L.)
Rosa, L. M., and McDowall, R. J. S., *92*
Rosenberg, E. (*See* Duncan, L. E., Jr., et al.)
Rosenberg, I. N. (*See* Raben, M. S., et al.)
Rosenfield, R. E., Vogel, P., and Rosenthal, N., *32*
Rosenthal, M. C., Dameshek, W., and Burkhardt, R., *80*
Rosenthal, N. (*See* Rosenfield, R. E., et al.)
Rosove, L. (*See* Binder, M. J., et al.)
Ross, A., *5*
Roth, G. M. (*See* Eyster, W. H., Jr., et al.)
Roth, L. W. (*See* McIntire, F. C., et al.)
Rothermich, N. O. (*See* Frankel, A. L.)
Rowe, A. H., Jr., and Rowe, A. H., *86*
Rubens, E., *53*
Ruth, R. (*See* Makinodan, T., et al.)

S

Sadove, M. S., Wyant, G. M., and Kretchmer, H. E., *63*
Salen, E. B., *18*

Salk, J. E., and Laurent, A. M., *94*
Salvi, G. (*See* D'Ermo, F.)
Samitz, M. H., Horvath, P., and Bellet, S., *18*
Santorocco, N. (*See* D'Ermo, F.)
Sauer, G. C. (*See* Sulzberger, M. B., et al.)
Scheer, E. H., *37*
Schiff, B. L., *4*
Schild, H. O., Hawkins, D. F., Mongar, J. L., and Herxheimer, H., *65*
Schleinzer, R., *34*
Schuppli, R., *23*
Schutz, K. H. (*See* Spier, H. W.)
Schwartz, E., *17*
—. (*See* Leibowitz, H.)
Schwartz, L., *5, 54*
Schwarz, G., *23*
Schwarz, J. (*See* Kile, R. L., et al.)
Scudamore, H. H., Vorhaus, L. J., II, and Kark, R. M., *66*
Seastone, C. V. (*See* Crepea, S. B., et al.)
Seelich, F., and Hubl, P., *78*
Selman, M. W., *3*
Shaffer, B., Burgoon, C. F., and Gosman, J. H., *12*
Shaffer, J. M. (*See* Havens, W. P., Jr., et al.)
Shapiro, A. (*See* Robinson, H. M., Jr., et al.)
Sheldon, J. M., Husten, J. R., and Lovell, R. G., *60*
Shepherd, D. M., and West, G. B., *40*
Sherago, M., Berkowitz, B., and Reitman, M., *56*
Sherman, W. B., and Caulson, E. J., *38*
Shick, R. M. (*See* Baggenstoss, A. H., et al.)
Shih-Man, C. (*See* Massell, B. F., et al.)
Sidi, E., and Dobkevitch-Morrill, S., *22*
Siegal, S., *7*
Silber, E. N., Snider, G. L., Goldberg, H., Katz, L. N., and Radner, D. B., *60*
Simonds, J. P. (*See* Fager, D. B. et al.)
Smith, D. J., *44*
Snider, G. L., (*See* Silber, E. N., et al.)
Sokoloff, L. (*See* King, B. D., et al.)
Solomon, D. H. (*See* Duncan, L. E., Jr., et al.)
Sonck, C. E., *4, 70*
Soylemezoglu, B., and Wells, J. A., *43*
Sperber, P. A., *14*
Spier, H. W., and Schutz, K. H., *4*
Spring, M., *24*
Sproull, M. (*See* McIntire, F. C., et al.)
Steinberg, C. L., and Roodenburg, A. I., *4*
Steiner, K. (*See* Leifer, W.)
Sternberg, S. D., Zweifler, B. M., Gruber, S., and Lichterman, J., *31*
Sternberg, T. H., Newcomer, V. D., and Linden, I. H., *67*
Stetson, C. A., Jr., *10, 74, 89*
Stoerk, C. (*See* Fischel, E., et al.)
Stolarsky, F. (*See* Haley, T. J.)
Strauss, L., Churg, J., and Zak, F. G., *68*
—. (*See* Churg, J.)
Stromme, O., *6, 88*
Stumpe, W. M. (*See* Anderson, G. E. et al.)
Sturgis, G. P. (*See* Massell, B. F., et al.)
Sulzberger, M. B., Sauer, G. C., Herrmann, F., Baer, R. L., and Milberg, I. L., *86*
—. (*See* Baer, R. L.)
Suter, M. (*See* Jadassohn, W.)
Swartz, H., *51*

T

Talmage, D. W., Dixon, F. J., Bukantz, S. C., and Dammin, G. J., *30*
—. (*See* Dixon, F. J.)
Teverbaugh, J. (*See* Derbes, V. J., et al.)
Theodos, P. A., *56*
Thomas, G. J. (*See* Beinhauer, L. G., et al.)
Tollotson, I. G. (*See* Marsh, R. R.)
Tomashefski, J. F. (*See* Motley, H. L.)
Tomlinson, L. J. (*See* Larson, D. L.)
Tompsett, R. (*See* LeMaistre, C. A., et al.)
Treit, J. (*See* Böe, J., et al.)
Truitt, G. W., *49*
Tuft, L., *2*

U

Unger, L. J., *14*
Unspaa, V. J., *41*
Ureles, A. L., and Kalmansohn, R. B., *95*
Usndek, H. E., Curtiss, W. P., and Neill, E. J., *6*

V

Vanderboom, K. (*See* Milzer, A., et al.)
Vaughan, D. D. (*See* Derbes, V. J., et al.)
Vaughan, J. H., Bayles, T. B., and Favour, C. G., *78*
Vetter, H. (*See* Braunsteiner, H., et al.)
Vogel, P. (*See* Rosenfield, R. E., et al.)
Vollmer, H., *75*
Vorhaus, L. J., II (*See* Scudamore, H. H., et al.)

W

Waldman, S. (*See* Pelner, L.)
Walker, W. G. (*See* Mundy, W. L., et al.)
Walsh, E. N. (*See* Winston, J. R.)
Wannamaker, L. W. (*See* Hahn, E. O., et al.)
Warin, R. P., *19*
Warren, J. V. (*See* Doyle, J. T., et al.)
Way, E. L., and Herbert, W. C., *76*
Weaver, N. K. (*See* Derbes, V. J., et al.)
Wechsler, R. L. (*See* King, B. D., et al.)
Weil, A. J., and Rogers, H. E., *20*
Weille, F. L., and Richards, A. B., *36*
Weinstein, L. (*See* Daikos, G.)
Weiss, M. A. (*See* Milzer, A., et al.)
Wells, J. A. (*See* Soylemezoglu, B.)
Welsh, J. B., *47*
West, G. B. (*See* Shepherd, D. M.)
Westermeyer, V. W. (*See* Raben, M. S., et al.)
Weston, G. A. (*See* McCawley, E. L., et al.)
Wheeler, R. E. (*See* Edsall, G., et al.)
White, R. V. (*See* Derbes, V. J., et al.)
Whitehead, R. W. (*See* Holtkamp, D. E., et al.)

Whittenberger, J. L. (*See* Boutourline-Young, H. J.)
Whitteridge, D. (*See* Pearce, J. W.)
Wiesel, L. L. (*See* Anderson, G. E., et al.)
Wiholm, S. (*See* Arner, B., et al.)
Wilson, J. S. (*See* Doyle, J. T., et al.)
Wilson, L., *56*
Wilson, R. H., Booth, A. N., and DeEds, F., *9*
Winston, J. R., and Walsh, E. N., *52*
Winternitz, W. W., and Hackel D. B., *56*
Witham, A. C., and Fleming, J. W., *11*
Wnuck, A. L. (*See* Jaros, S. H., et al.)
Wolf, J. (*See* Pascher, F.)
Wolfe, H. R. (*See* Makinodan, T., et al.)
Wolff, H. G. (*See* Graham, G. T., et al.)
Woodin, W. G. (*See* Adair, C. V., et al.)
Woodruff, M., and Forman, B., *46*
Woods, A. C. *20*
Wyant, G. M. (*See* Sadove, M. S., et al.)

Y

Younghusband, O. Z. (*See* McLean, C. R., et al.)

Z

Zak, F. G. (*See* Strauss, L., et al.)
Zeligman, I. (*See* McCulloch, H.)
—. (*See* Robinson, H. M., Jr., et al.)
Zindler, G. A., and Colovos, G. C., *37*
Zodikoff, R. (*See* Zoss, A. R.)
Zoss, A. R., and Zodikoff, R., *17*
Zweifler, B. M. (*See* Sternberg, S. D., et al.)

SUBJECT INDEX—ALLERGY ABSTRACTS

A

Acetylcholine, serum content of, in patients with bronchial asthma, *66*
ACTH, aerosol-administered, effect of, on eosinophiles, *48*
allergy to, *8*
and bacterial pyrogen, comparison of leukocyte response to, *43*
and cortisone, aggravation or suppression of febrile response of rabbits to bacterial endotoxin by, *77*
effect of, on increased permeability during inflammation, *73*
on phagocytosis, *78*
on upper respiratory tract, *55*
potentiation of pressor response to L-norepinephrine by, *59*
atopic eczema treated with, *5*
effect of, on allergic cutaneous reactions, *84*
on anti-red cell antibodies in acquired hemolytic anemia, *14*
on eosinophile counts in pre-eclampsia, *27*
on skin diseases and skin physiology, *86*
on tuberculin reaction and skin injury by turpentine in guinea pigs, *26*
in clinical ophthalmology, *20*
positive skin reactions to, *8*
reaction to intravenous use of, *56*
treatment of various skin diseases with, *85*
use of, in treatment of chrysodermatitis, *4*
Adrenalin, metabolic effects of chronic administration of, *93*
Adrenocortical hormones and antibody formation, *16*
Aliphatic acids, allergic reactivity to, *20*
Allergenic extracts, in vitro test for determination of potency of, *12*
inhibition of red cell isoagglutination by, *12*
Allergic eczematous sensitivity, attempts at passive transfer in man, *68*
granuloma, differentiation from periarteritis nodosa, *70*
granulomatosis, *70*
cutaneous lesions of, *68*
management, effect on growth of allergic children, *47*
maxillary sinusitis, *88*
Allergy, in otolaryngology, *87*
of external ear, *88*
otolaryngology and, *36*
respiratory, cold as cause of, *6*
role of, in otology, *88*
Alloxan, action on tuberculin sensitivity in guinea pigs, *92*
Anaphylactic hypersensitivity, production of, in rabbits, to foreign proteins in Freund's adjuvant, *72*
shock, effect of cortisone on mouse tissue, electrolyte changes during, *57*
ocular changes in, *25*
vitamin B intravenously as cause of, *37*
Anaphylaxis, effect of Thorotrast on, *25*
in guinea pigs, effect of cortisone and ACTH upon, *38*
Angiitis, allergic, *70*
Anthocyaninuria, beet sensitivity as cause of, *37*
Antibodies, failure to demonstrate, in eczematous contact-type dermatitis, *66*
hemagglutinins, titration of, by trypsin technique, *80*
use of antiglobulin to demonstrate, *32*
Antibody, anti-red cell hemolysin, dissociability of, from antigen, *42*
levels, effect of ACTH on, *32*
patterns, in North Alaskan Eskimos, *32*
production, effect of hepatic disease upon, *44*
of irradiation on, *29*
lymphocytes in the hyperimmunized rabbits as factor in, *27*
relation of serum albumin and globulin levels to, *77*
use of mineral oil adjuvant for, with relation to influenza immunization, *94*
protein, failure of cortisone to affect rate of disappearance of, *42*
response, influence of pantothenic acid upon, *45*
Antigen, bacterial polysaccharide, localization of, following intravenous administration and inhalation, *29*
elimination from blood as manifestation of immune response, *30*
persistence of albumin and globulin derivatives of, in mouse, *94*
radioactive, organ and subcellular deposition of, *75*
Antigens, protein, localization of, in rabbits, *26*
radioiodinated, blood and tissue concentration of, in rabbits, *12*
Antihistaminics, action of, on cardiac auricular irritability, *41*
on conjunctival flora, *28*

Antihistaminics—Cont'd
and histamine, effect on coagulation of normal and heparinized rabbit plasma, *13*
assessment of activity in man, *5*
effect of, in counteracting skin phagocytosis, *61*
on cutaneous reactions, *69*
on diffusion and absorption from skin, *69*
on eye, *21*
on histologic appearance of nasal polypi, *69*
on in vivo propulsive intestinal motility, *41*
on nerve tissue oxygen metabolism, *43*
on reticuloendothelial system, *73*
on skin tests with bacterial and fungous antigens, *35*
on thyroxine metamorphosis in tadpoles, *76*
sodium pentobarbital on toxicity of, *76*
impotence as side reaction to, *16*
skin tolerance to, *52*
therapeutic use in dermatology, *19*
toxicity of, in children, *45*
use and abuse of, *71*
of, in allergic eye diseases, *21*
vasoconstrictor properties of, *58*
Antilymphocytic serum, effect of, on in vivo suspension of lymphocytes, *46*
Antipyrine, drug eruption and epididymitis due to, *23*
Antirabies vaccine, complement-fixing antibodies to rabbit and human brain, induced by, *8*
Antistine, eye drops, as cause of palpebral dermatitis, *35*
Arsenic, inorganic, toxic hepatitis caused by, *49*
Arsenical dermatitis, antiasthmatic medication as cause of, *34*
Arteritis, effect of cortisone on experimental production of, *70*
experimental, in rabbits, *91*
Arthus phenomenon, possible relationship to rheumatic fever of, *74*
reaction, mechanism of, and similarity to, Shwartzman phenomenon, *89*
Asthma, breathing exercises in treatment of, *50*
Candida albicans as cause of, *82*
clinical management of, in elderly patient, *2*
cortisone treatment of, *18*
induction of, by aerosol techniques, *33*
penicillin aerosol as cause of, *36*
treatment with pregnenolone acetate of, *51*
Atopic dermatitis, cortisone in treatment of, *67*
in infants and children, *86*
studies on peripheral vascular physiology in, *68*
eczema, ACTH in treatment of, *5*
Aureomycin, anaphylactic-like reaction to, *24*
Auricular fibrillation, use of antihistamines in, *41*

B

Bacterial allergy, treatment of, with bacterial filtrates, *45*
and fungous antigens, influence of antihistamines on skin tests with, *35*
filtrates, in treatment of bacterial allergy, *45*
pyrogen and ACTH, comparison of leukocyte response to, *43*
Bamboo, contact dermatitis caused by, *4*
Beet sensitivity, anthocyaninuria as manifestation of, *37*
Benadryl, lack of effectiveness of, in altering respiratory tract fluid output, *61*
Benign paroxysmal peritonitis, *95*
Bichromate, contact sensitivity to, in railroad employees, *52*
Breathing exercises, treatment of chronic pulmonary diseases by, *50*
Bronchi, clinical physiology of, *26*
Bronchial asthma, death from, during cortisone therapy, *17*
denervation of lungs in treatment of, *3*
dry rot as cause of, *88*
management of, in small hospitals, *33*
mushroom fly as cause of, *49*
oxymeter studies during attacks of, *2*
pituitary gland implantation in treatment of, *18*
treatment of refractory cases of, *50*
with norisodrine sulfate dust, *51*
muscle, isolated, reaction of, to specific antigen, *65*
Bronchospastic disease, progressive, *81*
Bronchus, isolated human, action of specific antigen on, *92*
various drugs on, *92*

C

Candida albicans, asthma caused by, *82*
Capillary permeability during inflammation, effect of ACTH and cortisone on, *72*
Cardiac lesions, in rabbits receiving horse serum injections, *39*
Carditis, experimental, in rabbits, *91*
Castor bean sensitivity, case report of, *36*
Chlorcyclizine hydrochloride ointment, pruritic dermatoses treated with, *31*
Chloromycetin, acquired contact sensitivity to, *52*
skin eruption due to, *6*
Cholinesterase, plasma and erythrocyte content of, in patients with bronchial asthma, *66*
Chromatography, analysis of ragweed pollen extract by, *3*
Cinnamon, contact dermatitis due to, *4*

Coccidioidin sensitivity, in Norway, *20*
Cold allergy, an occupational disease, *6*
effect of, in respiratory allergy, *6*
Conjunctival flora, action of antihistamine drugs on, *28*
Contact dermatitis, bamboo as cause of, *4*
cinnamon as cause of, *4*
eurax as cause of, *67*
gasoline dyes as cause of, *35*
type dermatitis, failure to demonstrate antibodies in, *66*
importance of protein affinity of haptens in eliciting, *84*
Corticotropin, clinical efficiency of, increased by purification, *62*
hemorrhagic bullous urticaria treated with, *22*
Cortisone and ACTH, sulfhydryl inhibition as mechanism in effects of, *27*
atopic dermatitis treated with, *67*
death in bronchial asthma during therapy with, *17*
effect of, on antibody formation in humans, *79*
on arteritis produced by passive sensitization, *70*
on experimentally-induced contact dermatitis, *52*
on histamine liberation induced by Tween, in dogs, *60*
on lesions of periarteritis nodosa, *59*
on mouse tissue electrolyte changes during anaphylactic shock, *57*
on passive anaphylaxis in guinea pig, *71*
on skin sensitization and irritation, *53*
on streptococcal infections and complications, *14*
on tuberculin reaction, *75*
on vasoconstriction due to histamine, *44*
erythema nodosum treated with, *95*
in clinical ophthalmology, *20*
in vitro effect on mesodermal tissues, *91*
intractable asthma, treated with, *17*
nasal and cutaneous allergy to, *21*
treatment of allergic purpura in children with, *57*
of bronchial asthma with, *66*
of various skin diseases with, *85*
Cross-sensitization dermatitis, role of antihistaminic drugs in production of, *5*

D

Dehydro-ascorbic acid, action on tuberculin sensitivity in guinea pigs, *92*
Demerol poisoning, case report of, *63*
Dermatitis, atopic, in infants and children, *86*
hat felts as cause of, *4*
incidence of, among workers in plastic industry, *67*
occupational, among physicians, *53*
palpebral, antistine eye drops as cause of, *35*
sensitivity to bichromate as cause of, in railroad workers, *52*
Diphtheria, antigenicity of various strains of, *80*
immunization, quantitative antibody response to small doses in, *15*
toxoid, reactions to crude and purified preparations of, *15*
Drug eruption, antipyrine as cause of, *23*
sickness, electrocardiographic changes in, *59*
Dry rot, bronchial asthma due to, *88*
Dust extracts, standardization of, on basis of molecular size, *56*

E

Eczema of hands, *86*
Electrophoresis, multiple skin testing by, *15*
Emphysema, use of respirator to re-establish carbon dioxide sensitivity in, *1*
Eosinopenia following epinephrine administration, *28*
Eosinophile levels, factors influencing, *44*
Eosinophiles, in antral washings, *6*
Eosinophilia, diagnostic value of, *48*
in antral washings, cyto-histologic method for determining, *88*
tropical, relation to filariasis, *31*
Epididymitis, antipyrine as cause of, *23*
Epinephrine, effect of, on cerebral blood flow, *73*
on pulmonary circulation, *11*
migraine treated with, *14*
Erythema nodosum, cortisone in treatment of, *95*
Eurax, contact dermatitis due to, *67*
External ear, allergy of, *88*

F

Flavonoids, protectoin against histamine shock by, *9*
Fowler's solution, arsenical dermatitis following use of, *34*
Fungi, etiologic factor in miner's asthma, *3*

G

Genital dermatitis, penicillin as cause of, *85*
Glomerulonephritis, experimental, in rabbits, *30, 91*
failure of ACTH to inhibit appearance of, *32*
Rhus toxin as cause of, *12*
Granuloma, eosinophilic, of stomach and small intestine, *63*
Granulomatosis, allergic, *70*
Growth, effect of allergic management on, *47*
Guinea pig antisera, sensitization of human skin by, *38*

H

Hay fever, algae as cause of, *49*
Hemagglutination, use of, as variation of particle-agglutination technique, *30*

Hepatitis, toxic, inorganic arsenic treatment of asthma as cause of, *49*
Histaminase activity of human blood and placenta in pregnancy, *41*
Histamine desensitization, mode of action, *43*
effect of, on activity of hyaluronidase, *78*
on fungistatic action of antihistaminics, *19*
on phagocytosis, *61*
liberation, Tween-induced in dog, effect of cortisone on, *60*
production and destruction by bacteria, *14*
release, studies of, in rabbit blood by simple molecules, *39*
toxicity, in adrenalectomized mice, potentiation by adrenaline of protective effect of cortisone on, *74*
Histoplasmin sensitivity, in Norway, *20*
Hydroxyquinolines, sensitization to halogenated compounds of, *20*
Hypersensitiveness, local, of rabbit stomach, *78*

I

Impotence, antihistaminic therapy as cause of, 16
Infection, effects of cortisone on, *14*
Infectious asthma, prophylactic treatment with sulfonamides, *34*
Iodine I^{131} labelled bovine gamma globulin, catabolism of, in immune and nonimmune rabbits, *77*
sensitivity, cortisone in treatment of, *56*
Isoagglutination, inhibition of, by allergenic extracts, *12*
Isuprel, effect on antigen-antibody and histamine skin reactions, *60*
Itch, analysis of nerve pathways and characteristics of, *11*

K

Keloid, positive patch test as cause of, *55*
Khellin, bronchial asthma treated with, *51*
effect of, on respiration in human beings, *60*
Kwell, eczematous reactions to, *19*

L

Leocillin, predilection for lung tissue of, *47*
Leukocyte changes, comparisons of, in pyrogenic and anaphylactic reactions in guinea pig, *72*
transfer of cutaneous reactivity to streptococcal antigens, *96*
Levo-nor-epinephrine, occurrence of, in toad venom, *46*
Liver extract, severe reaction to, *24*
Löffler's syndrome, parasitic infestation associated with, *37*
Lung infections, treatment with penicillin derivative of, *32*
Lupus erythematosus disseminatus, response of serum globulin level and complement titer to ACTH therapy in, *78*

M

Mercuhydrin, toxic reaction to, *16*
Migraine, treatment of, by head traction, manipulation, and thiamin chloride, *9*
with epinephrine, *14*
Miner's asthma, role of fungi in, *3*

N

Nasal surgery, effects of, in asthmatics, *36*
Neomycin, contact sensitivity to, *53*
Nephritis, experimental, in rabbits, effect of antihistaminics on, *56*
Nephrotoxic antigen, localization of, *91*
Nicotinic acid, genital dermatitis treated with, *85*
Noradrenaline, content of animal and human adrenals, *40*
Nor-epinephrine, effect of, on cerebral blood flow, *73*
Norisodrine sulfate dust, in treatment of asthma, *51*

O

Otolaryngology, modern trends with respect to allergy, *36*
Otology, role of allergy in, *88*

P

Para group, cross sensitization to, *22*
ingestion and injection testing in, *22*
Para-aminobenzoate, treatment of eczematoid dermatitis with, *18*
Para-aminosalicylic acid, allergic reaction to, *57*
Parasitic infestation, pulmonary infiltration associated with, *37*
Passive sensitization of human skin, by guinea pig ovalbumin antisera, *38*
Patch test, keloid resulting from, *55*
reaction, local effect of Compound F on, *54*
standardization of, *5*
Penicillin aerosol, asthma due to, *36*
allergic reactions to, *23, 53*
cross reactions between penicillin O and penicillin G, *7*
effect of treatment with, upon bacteriostatic antibody, *63*
G, hydriodide ester of, lung infections treated with, *32*
hypersensitivity to, *4*
O, skin reactions to, *85*
use of, in allergic reactions to penicillin G, *7*
purpuric and nephritic reaction from, *24*
reaction, simulating atopic dermatitis, *35*
sodium dehydrocholate, in treatment of, *62*
sensitivity, bullous eruption caused by, *18*
purpura as manifestation of, *85*

Penicillin aerosol—Cont'd
relationship between penicillin G and penicillin O, *18*
Periarteritis nodosa, cortisone in treatment of, *59*
glomerulonephritis associated with, *92*
hydantoin hypersensitivity as cause of, *23*
in childhood, *71*
pathogenesis of, *92*
treatment of, with ACTH and cortisone, *24*
Physiology, clinical, of bronchi, *26*
Plasma cells, relation of, to antibody production, *42*
Plastics, dermatitis encountered in manufacture of, *67*
Pneumococcus polysaccharide, absence of prosthetic grouping in, *30*
Poliomyelitis, experimental, effect of pertussis, diphtheria toxoid, and Salmonella immunization on, *45*
injections as precipitating cause of, *13*
virus, immunologic groups of, *79*
Precipitin production, relation between circulating antibody and anaphylatic shock in chicken, *71*
Pregnenolone acetate, treatment of asthma with, *51*
Procaine amide, clinical study of, *63*
hydrochloride, intravenous use of, in control of pruritus, *82*
Protease activation, role of, in rabbit anaphylaxis, *90*
Protein antigens, localization of, in rabbits, *26*
Pruritic dermatoses, chlorcyclizine hydrochloride ointment in treatment of, *31*
Pruritus, intravenous use of procaine hydrochloride in control of, *82*
Pulmonary arterial and capillary pressures, effect of rapid saline infusion on, *25*
vessels, nerve receptors in, *58*
Purpura, allergic, cortisone therapy in, *57*
manifestation of penicillin sensitivity, *85*
Pyribenzamine, allergic transfusion reactions prevented by, *64*
treatment of nonspecific upper respiratory infections with, *87*

Q

Quinidine, allergy to, *37*
Quotane, effectiveness of, as topical anesthetic, *82*

R

Renal cortical necrosis, experimental, in rabbits, *91*
Respiratory function tests, in hay fever patients, *34*
in pollen asthmatics, *34*
Reticulo-endothelial function, use of radioactive chromium phosphate in study of, *73*
Rheumatic fever, role of leucocytic and platelet thrombi in pathogenesis of, *74*
Rheumatoid arthritis, remission following stress of an allergic reaction, *9*
Rhus dermatitis, treatment of, with corticotropin or cortisone, *83*
with 3-n-pentadecyl catechol, *19*
with zirconium salts, *83*

S

Sarcomata, atrophying, antigenicity of, *8*
Scarlatinal toxin, allergenic property of, *38*
Schoelein-Henoch disease, surgical importance of, *46*
Serum disease, antibody reactions in, *23*
sickness, in rabbits, alterations in fluid distribution in, *22*
Shwartzman phenomenon, acquired resistance to, *62*
as complication of meningitis, *31*
pathogenesis of, *10*
possible relationship to rheumatic fever, *74*
Sinusitis, eosinophile counts of antral washings in, *6*
Soaps, irritant properties of, *54*
Sodium dehydrocholate, penicillin reactions treated with, *62*
pentobarbital, effect of, on toxicity of certain antihistamines, *76*
Streptococcal bacteriostatic antibody, effect upon, in patients treated with penicillin, *63*
Streptococci, cellular transfer of delayed cutaneous reactivity to, *96*
Streptokinase-streptodornase, toxic reactions to, *79*
Streptomycin, allergic reactions to, *23*
Stress, leukocyte response to, in normal and adrenalectomized rats pretreated with ascorbic acid, *40*
Sulfonamides, use of, in prophylaxis of infectious asthma, *34*

T

Thiamine, intolerance to, *89*
Tissue antibody, method for demonstration of, *13*
culture studies, effects of specific contact allergens on sensitized and nonsensitized human skin, *87*
cultures, determination of bacterial sensitivity by use of, *45*
Transfusion reactions, allergic, Pyribenzamine as preventative of, *64*
Trichophyton, immediate reaction to, *83*
Tuberculin reaction, effect of ACTH on, in guinea pigs, *26*
cortisone on, *75*
sensitivity, effect of ascorbic acid on, *28*
on skin explants, in guinea pigs, *47*
Tuberculosis, effect of cortisone on, with regard to skin reaction, serum antibodies, and clinical course, *39*

U

Urticaria, hemorrhagic bullous, treatment of, with corticotropin, *22*

V

Vagus section, effects of, on bronchial tree, *26*

Vitamin B_{12}, effect on blood, with special reference to eosinophils, *47*

Vitamin—Cont'd

deficiency states, effect on circulating antibodies, *48*

W

Wasp sting, reaction to, *70*

Z

Zirconium, Rhus dermatitis treated with, *83*